The Relation Between Appraised Mismatch and the Duration of Negative Emotions: Evidence for Universality

Verduyn, Philippe; Van Mechelen, Iven; Tuerlinckx, Francis; Scherer, Klaus R.

How to cite

VERDUYN, Philippe et al. The Relation Between Appraised Mismatch and the Duration of Negative Emotions: Evidence for Universality. In: European Journal of Personality, 2013, vol. 27, p. 481–494. doi: 10.1002/per.1897

This publication URL: https://archive-ouverte.unige.ch/unige:97888

Publication DOI: 10.1002/per.1897

European Journal of Personality, *Eur. J. Pers.* **27**: 481–494 (2013)
Published online 14 January 2013 in Wiley Online Library (wileyonlinelibrary.com) **DOI**: 10.1002/per.1897

The Relation Between Appraised Mismatch and the Duration of Negative Emotions: Evidence for Universality

PHILIPPE VERDUYN[1]*, IVEN VAN MECHELEN[1], FRANCIS TUERLINCKX[1] and KLAUS SCHERER[2]

[1]*Department of Psychology, University of Leuven, Belgium*
[2]*CISA, University of Geneva, Geneva, Switzerland*

Abstract: Emotions are processes that unfold over time. As a consequence, a better understanding of emotions can be reached only when their time-related characteristics can be assessed and interpreted adequately. A central aspect in this regard is the duration of emotional experience. Previous studies have shown that an emotional experience can last anywhere from a couple of seconds up to several hours or longer. In this article, we examine to what extent specific appraisals of the eliciting event may account for variability in emotion duration and to what degree appraisal–duration relations are universal or culture specific. Participants in 37 countries were asked to recollect emotional episodes of fear, anger, sadness, disgust, shame and guilt. Subsequently, they were asked to report the duration of these episodes and to answer a number of questions regarding their appraisal of the emotion-eliciting event. Multi-level analyses revealed that negative emotions last especially long when the eliciting event and its consequences are perceived to be incongruent with the individual's goals, values and self-ideal, creating a mismatch. These relations are largely universal, although evidence for some limited variability across countries is found as well.

Key words: emotion duration; appraisal; cross-cultural; universality; mismatch

As emotions are dynamic processes that unfold over time, their time-related aspects need to be assessed in addition to eliciting factors and response patterns. However, studies on the temporal characteristics of emotions are scarce. Recently, an increasing number of authors have argued that this state of affairs gives cause for concern. (Davidson, 1998; Eaton & Funder, 2001; Frijda, 2007; Hemenover, 2003; Schimmack, Oishi, Diener, & Suh, 2000; Verduyn, Van Mechelen, Tuerlinckx, Meers, & Van Coillie, 2009).

In the present paper, we aim to contribute to the study of emotion dynamics by examining one central temporal characteristic of emotions, namely their duration. For a long time, emotions were considered to be flash-like responses that typically last for only a couple of seconds (e.g. Ekman, 1984; Oatley & Johnson-Laird, 1987). However, this view was challenged by Frijda, Mesquita, Sonnemans, and Van Goozen (1991) who argued that emotions not only may be very brief but also can often also last for minutes, hours, days or even longer. This claim is supported by data from a number of large-scale actuarial studies of recalled emotion episodes (Scherer & Wallbott, 1994; Scherer, Wallbott, & Summerfield, 1986) and has been confirmed in several recent studies including work by Gilboa and Revelle (1994), Sonnemans and Frijda (1994), Verduyn, Delvaux, Van Coillie, Tuerlinckx, and Van Mechelen (2009) and Verduyn, Van Mechelen, and Tuerlinckx (2011). Strong evidence comes from a quasi-representative study in which 1200 Swiss citizens reported the most intense emotion they experienced on the previous day. Over 35% of all recalled emotions were reported to last over an hour, and only 8% were perceived as lasting only a few seconds (Scherer, Wranik, Sangsue, Tran, & Scherer, 2004, Table 10).

As emotion duration is highly variable, one may wonder which factors account for this variability. So far, a number of studies on determinants of emotion duration have been conducted (Fischer & Manstead, 2000; Sbarra, 2006; Schimmack, 2003; Verduyn, Delvaux, et al., 2009; Verduyn et al., 2011; Wallbott & Scherer, 1988). However, these studies suffer from two limitations.

First, one important class of potential determinants has almost entirely been ignored, namely appraisals. One of the currently most influential theoretical orientations claims that it is appraisals that determine the nature and intensity of emotions (e.g. Frijda, 1986; Roseman, 1984; Scherer, 1984, 2001; Smith & Ellsworth, 1985) and thus presumably also duration. Yet, the appraisal–duration relationship has rarely been investigated in a systematic fashion (for an exception, see a study by Verduyn, Delvaux, et al. (2009), in which a positive relationship between perceived event importance and emotion duration was reported).

Second, studies on determinants of emotion duration are largely limited to a few Western countries. Only a few cross-cultural studies on emotion duration have been conducted. Moreover, those focused merely on differences in duration between countries and determinants thereof, leading to observations such as the fact that emotions last

*Correspondence to: Philippe Verduyn, University of Leuven, Department of Psychology, Tiensestraat 102, 3000 Leuven, Belgium.
E-mail: philippe.verduyn@psy.kuleuven.be

Received 24 January 2012
Revised 3 August 2012, Accepted 3 August 2012

on average longer in poor as compared with rich countries (Wallbott & Scherer (1988) and in collectivistic as compared with individualistic cultures (Fischer & Manstead, 2000). Issues other than differences in duration between countries have not been addressed. In particular, this holds true for the question to what degree within-country relations between duration and determinants such as appraisals are universal.

To tackle these limitations, we conducted a secondary analysis of the data from a large cross-cultural study on emotions, namely the International Survey on Emotion Antecedents and Reactions (ISEAR; Scherer & Wallbott, 1994). The first aim of this reanalysis is to examine the relationship between a set of appraisals and emotion duration. The second aim is to examine the universality versus cultural specificity of appraisal–duration relations. As the ISEAR data set contains especially detailed information for negative emotions, both aims will be addressed for such emotions only. In the following text, we will discuss the two aims in more detail.

The relation between appraisals and the duration of negative emotions

A basic premise of cognitive emotion theory is that people's emotions arise from appraisals (i.e. evaluations) of their circumstances (for an overview, see Ellsworth & Scherer, 2003). Many different appraisal dimensions have been proposed by appraisal theorists (for a comparative overview, see Scherer, 1999), many of them coming down to a comparison between an event and a desired state. For example, an appraisal of goal congruency implies a check of whether an event is conducive to reaching one's goals and an appraisal of (un)fairness implies a check of whether an event corresponds to what one considers to be equitable.

Individual differences and personality traits play a central role during the process of situation appraisal (for an overview, see Kuppens & Tong, 2010). Indeed, research on general appraisal tendencies has shown that people differ in how they appraise situations irrespective of the specific nature of the event (Van Reekum & Scherer, 1997). For example, individuals high in neuroticism are more likely to appraise events as goal incongruent (Tong et al., 2006). In addition to general appraisal tendencies, individual differences in appraisal processes can also be situation contingent. For example, Kuppens and Van Mechelen (2007) found evidence for a situation dependent relation between neuroticism and threat to self-esteem.

A central hypothesis within appraisal theory is that when an event is appraised to create a mismatch between the current state and a desired one, a negative emotion follows, and that the stronger the mismatch, the more intense the negative emotion will be (e.g. Frijda, 1986; Scherer, 1984). This hypothesis has been supported by a large number of studies accounting for intra-individual as well as inter-individual differences in the intensity of negative emotions (e.g. Scherer, 1997a; Sonnemans & Frijda, 1995). For example, regarding the latter, it has been found that individuals who tend to appraise events as more frustrating and unfair (i.e. mismatches) experience more intense episodes of anger (Kuppens & Van Mechelen, 2007).

One may wonder whether the mismatch hypothesis can be extended to the duration of negative emotions. Similar mechanisms may drive the intensity and duration of emotions (Verduyn et al., 2011). Yet, it should not be taken for granted that factors determining intensity will also determine duration without examining whether this is the case indeed (Frijda, 2007), especially because intensity and duration are only moderately related (Frederickson & Kahneman, 1993; Sonnemans & Frijda, 1994). Therefore, in the current study, we examined the hypothesis that events that are appraised to imply a stronger mismatch with desired states are related to relatively longer negative emotions. For this purpose, we will focus on five different types of desired states, described in the following text.

Goal congruence

People aim to accomplish certain goals in life, and it is desirable that events bring one closer to attaining these goals. However, certain events may block the achievement of one's goals. The appraisal of goal blocking is present in many appraisal theories in various forms, including perceived goal obstacle (Smith & Ellsworth, 1985), motive inconsistency (Roseman, 1984) and goal obstruction (Scherer, 1993).

Confirmation of self-ideal

Self-ideal refers to one's desired social identity or self-concept (Ellsworth & Scherer, 2003). Individuals try to live up to their personal self-ideal, but sometimes, they fall short. In the latter case, negative emotions typically arise, and self-esteem or self-confidence may decrease (Scherer & Wallbott, 1994).

Value congruence

It is desirable that an event is compatible with one's values. In case of a mismatch, the event will be considered unfair and/or immoral (Scherer, 1993, 2001). Unfairness and immorality are related constructs, but one can argue that fairness as based on entitlement and justice considerations is a universal norm (with a strong evolutionary origin), whereas values and judgments of morality may be more variable and subject to cultural and historical change.

Controllability

People generally prefer to have control over their environment, but some events may require more coping resources than one possesses. The importance of this appraisal dimension was already recognized by Lazarus (1966) who argued that emotion and stress not only depend on the evaluation of a situation's significance for our well-being but also on our assessment of our ability to deal with the situation.

Confirmation of expectations

Unexpected events do not necessarily lead to intense negative emotions (consider, e.g., joy in case of a surprise party). However, if the event is perceived as undesirable, because of a violation of one or more of the desired states as described earlier, unexpectedness may function as an amplifier of negative emotions (e.g. Ortony, Clore, & Collins, 1988; Verinis, Brandsma, & Cofer, 1978).

DOI: 10.1002/per

The relation between appraisals and the duration of negative emotions: universal or culturally specific

For many years, cross-cultural psychologists have debated the degree to which psychological phenomena are culture dependent (e.g. Berry, Poortinga, Segall, & Dasen, 1992). This debate has also been extended to the universality of emotional phenomena (e.g. Ekman, 1994; Mesquita & Frijda, 1992; Russell, 1991). In this regard, appraisal theorists generally argue that, whereas the objects and criteria for appraisal checks may vary widely between cultures, appraisal–emotion relations, that is, the emotions to be expected on the basis of appraisal results such as goal conduciveness or coping potential, are unlikely to be affected by cultural factors (Ellsworth, 1994; Mesquita, Frijda, & Scherer, 1997; Scherer, 1997b). Empirical studies generally support this hypothesis, although slight cultural differences have been observed (Frijda, Markam, Sato, & Wiers, 1995; Mauro, Sato, & Tucker, 1992; Roseman, Dhawan, Rettek, Naidu, & Thapa, 1995; Scherer, 1997a).

However, the studies mentioned earlier focus exclusively on the nature and intensity of emotions. To date, the universality versus cultural specificity of appraisal–duration relations has not been systematically addressed. In the present study, we will contribute to filling this gap by examining appraisal–duration relations in several cultures. In line with previous results on the universality of appraisal–emotion relations, we hypothesize that appraisal–duration relations are largely universal, apart from possible minor cultural differences. If cultural differences were to emerge, we aim to account for these differences by means of two variables measured at a country level: gross national product and collectivism–individualism. As mentioned earlier, these variables have been shown to account for part of the variability in emotion duration between countries (Fischer & Manstead, 2000; Wallbott & Scherer, 1988).

In sum, the two major aims of the present study are (i) to examine the relationships between a set of appraisals and the duration of a set of negative emotions and (ii) to examine to what degree these relations are universal. For this purpose, we have performed an in-depth secondary analysis of the ISEAR data set (Scherer & Wallbott, 1994). These data (collected in 37 countries scattered around the world) include information on the duration of emotional episodes of fear, anger, sadness, disgust, shame and guilt, and on the way, the eliciting events were appraised in terms of degree of mismatch with goals, values, self-ideal, coping potential and expectations.[1]

The secondary data analysis reported in this article greatly extends the reports of the distribution of duration ratings across emotions and countries in the publication of the original data set in that the relationships between appraisal patterns and duration, as well as the generality (or universality) of these links, are systematically investigated with advanced multi-level statistical techniques. To our knowledge, this has not yet been reported in any other publication.

[1]The relationship between appraisals and the duration of positive emotions would also be an interesting topic to study: Similarly to the mismatch–duration relationship for negative emotions, one may expect a match–duration relation for positive ones. However, the International Survey on Emotion Antecedents and Reactions data set is less suited to examine this match–duration hypothesis as joy is the only positive emotion included (vs six negative emotions). As a result, it is not possible to examine to what degree the match principle holds for positive emotions in general; this is far from trivial as determinants of the duration of positive emotions can be emotion specific (e.g. Verduyn et al., 2011).

METHOD

A detailed description of the methodology used in the ISEAR is provided by Scherer and Wallbott (1994). Here, we report only on elements that are of immediate relevance for the present study.

Countries and respondents

The ISEAR database consists of data collected in 37 countries distributed across Europe, Africa, America, Asia and Oceania. Collaborators in each country were asked to recruit approximately 100 students, about half men and half women, and whenever possible, about half psychology students and half students from other fields of study. Foreign students were to be excluded as much as possible, and age was largely constrained to the range of 18–35 years. In total, the final data set comprises 2921 respondents, 55% women and 45% men, with a mean age of 21.8 years. Forty-three percent of the respondents were psychology students with the others coming from several different disciplines.

Country ratings on gross national product and individualism

For each of the 37 countries, the level of gross national product was collected from statistical yearbooks. Furthermore, for 27 countries, the level of individualism was obtained from the work of Hofstede (1991); for the remaining 10 countries, estimated levels were taken from Fischer and Manstead (2000).

Translation

In preparing the cross-cultural study, very elaborate translation–back translation–mediation procedures were used to ascertain that the corresponding terms in the different languages were as close to each other as possible. In one case, a translation error was detected after the data had been collected (the translation of *disgust* in Portuguese), and therefore, the Portuguese data for disgust were not included in the present analysis. For more details on the translation procedure, see Scherer and Wallbott (1994).

Materials and procedure

Participants were asked to fill out a questionnaire on their experience of several emotions. On the first page, participants were assured of the total anonymity of their responses and informed that for each of a number of emotions, they would be asked to recall a recent situation in which they

DOI: 10.1002/per

had experienced the emotion in question strongly and for which they vividly remembered the circumstances and their actions.

This first page was followed by a number of two-page sections, one for each of the emotions studied (fear, anger, sadness, disgust, shame and guilt). The sequence of the sections was randomized across participants to control for order effects. In each section, participants were first asked to describe, in as much detail as possible, the situation or event in which they had felt the emotion in question and indicate when it happened (1 = days ago, 2 = weeks ago, 3 = months ago and 4 = years ago). Next, they were presented with a number of closed questions. In the present study, we will only consider those that pertain to the duration and intensity of the emotional episode and to a number of ways in which the eliciting event was appraised. We list these questions along with the corresponding response options (in parentheses) in the following text.

Emotion duration: How long did you feel the emotion? (1 = a few minutes, 2 = an hour, 3 = several hours and 4 = a day or more). *Emotion intensity*: How intense was this feeling? (1 = not very, 2 = moderately intense, 3 = intense and 4 = very intense). *Goal congruency*: How important was the event for your goals, needs or desires at the time it happened? Did it help or hinder you to follow your plans or to achieve your aims? (1 = it helped, 2 = it didn't matter, 3 = it hindered and 0 = not applicable). *Self-ideal*: How did this event affect your feelings about yourself, such as your self-esteem or your self-confidence? (1 = negatively, 2 = not at all, 3 = positively and 0 = not applicable). *Unfairness*: Would you say that the situation or event that caused your emotion was unjust or unfair? (1 = not at all, 2 = a little, 3 = very much and 0 = not applicable). *Immorality*: If the event was caused by your own or someone else's behaviour, would this behaviour be judged as improper or immoral by your acquaintances? (1 = not at all, 2 = a little, 3 = very much and 0 = not applicable). *Coping potential*: How did you evaluate your ability to act on or to cope with the event and its consequences when you were first confronted with this situation? Check one, the most appropriate, of the following (1 = I did not think that any action was necessary, 2 = I believed that I could positively influence the event and change the consequences, 3 = I believed that I could escape from the situation or avoid negative consequences, 4 = I pretended that nothing important had happened and tried to think of something else and 5 = I saw myself as powerless and dominated by the event and its consequences). *Expectedness*: Did you expect this situation to occur? (1 = not at all, 2 = a little, 3 = very much and 0 = not applicable).

Data analysis

The data have a hierarchical structure, with observations of participants (level 1) being nested within countries (level 2). To take this into account, a series of multi-level regression analyses (e.g. Bryk & Raudenbush, 1992; Snijders & Bosker, 1999) was conducted for each emotion separately. We fitted two-level models for each emotion separately instead of fitting a three-level model to (i) have a straightforward indication to what degree findings generalize across emotions, (ii) avoid convergence problems when estimating our models and (iii) avoid an inflation of type I errors resulting from the increase in power when using a three-level model. All analyses were conducted in SAS 9.2. using proc mixed.

First, we constructed a model that included all appraisals under study as predictors of emotion duration at level 1, in addition to a random intercept (i.e. an intercept that was allowed to vary across countries). Six features of this model should be noted: (i) all appraisals were added to the model simultaneously; as such, if an appraisal was found to contribute to the explanation of the variability in episode duration, its contribution was assessed over and above that of the other appraisals under study; (ii) the same model was fit for each emotion regardless of the significance of each predictor to enhance the comparability of the findings across emotions; it is noteworthy that removing non-significant predictors did not alter significant findings; (iii) because of the nature of the response options, each appraisal was modelled as a categorical predictor by making use of dummy coding (with 'not applicable' as reference category); (iv) to make a meaningful comparison between the different response categories of each appraisal, significance tests were based upon a comparison of the predicted category mean with the average predicted mean of the remaining categories (including the 'not applicable' category); (v) predictors were not centred around the group mean as predictors are categorical in nature; (vi) to avoid list-wise exclusion of respondents due to missing values in response to one or only a few of the appraisal questions, missing values were included in the 'not applicable' response category of the corresponding appraisal (because the coping potential item did not contain a 'not applicable' response option, missing values were assigned to a newly created response category).[2]

Second, we examined whether model fit improved significantly by allowing the relation between each appraisal and emotion duration to vary across countries. We did so by allowing for a random slope for each response category of the appraisal variables in addition to a random intercept.

Third, we examined in more detail the appraisal–duration relations that were identified as varying across countries in the second step of our analysis. For this purpose, we started by inspecting the country-specific estimates to obtain a better understanding of the nature of the variability in question. Next, we tried to account for this variability by examining the relation of the country-specific estimates with individualism and gross national product. In particular, we included in our multi-level models individualism and gross national product as predictors of the intercepts and random slopes at level 2. As the country characteristics were strongly interrelated, we did not include individualism and gross national product in the model simultaneously but examined their contribution to the prediction one by one.

[2]When not applicable responses were treated as missing values, a highly similar pattern of results was found.

DOI: 10.1002/per

RESULTS

Duration of negative emotions: descriptive statistics

The mean duration of fear, anger, sadness, disgust, shame and guilt is presented in Table 1 together with the proportion of each response category of the duration variable. On the one hand, duration is highly variable within emotions; for each emotion under study, it was found that an episode may last from a few minutes up to more than one day. On the other hand, duration also varies between emotions; on average, some emotions last longer than others. Specifically, sadness lasts for the longest amount of time followed by guilt, anger, shame and, finally, the other two negative emotions under study (i.e. disgust and fear), which last on average equally long.

Table 1. Proportion of each response category and mean for duration variable for each of six emotions

	Emotion					
	Fear	Anger	Sadness	Disgust	Shame	Guilt
Response category						
1: A few minutes	.31	.20	.05	.32	.29	.14
2: An hour	.15	.17	.05	.15	.13	.11
3: Several hours	.26	.28	.16	.23	.23	.27
4: A day or more	.28	.35	.74	.30	.35	.48
Mean	2.52[a]	2.78[c]	3.60[e]	2.51[a]	2.63[b]	3.09[d]

Note: Means and proportions are calculated collapsing data across countries. Means that do not share subscripts differ at $p < .01$ in the Tukey honestly significant difference comparison while taking the multi-level structure of the data into account.

Appraisals: descriptive statistics

For all appraisal variables, the proportion of each response category is presented for each emotion separately in Table 2. With regard to the implications of the eliciting event for one's goals and self-ideal, it was found that it is very rare for the eliciting event to help to achieve one's goals or have positive consequences for one's self-ideal; this is not surprising given that all the emotions under study are negative. Regarding unfairness, immorality and coping potential, all response categories occur rather frequently, which implies high variability on the three appraisal variables in question. Finally, with regard to unexpectedness, the occurrence of the eliciting event was most often totally unexpected for all emotions.

Table 2. Proportion of each response category for appraisal variables for each of six emotions

		Emotion					
Appraisal	Response category	Fear	Anger	Sadness	Disgust	Shame	Guilt
Goals							
	Helped	.09	.07	.08	.06	.10	.11
	Neutral	.30	.25	.22	.35	.32	.29
	Hindered	.31	.50	.45	.29	.34	.36
	N/A	.30	.18	.25	.30	.24	.24
Self-ideal							
	Positive	.14	.14	.11	.10	.07	.08
	Neutral	.33	.37	.29	.39	.26	.24
	Negative	.31	.32	.35	.23	.52	.54
	N/A	.22	.17	.25	.28	.15	.14
Unfairness							
	Not at all	.27	.11	.24	.17	.34	.33
	A little	.19	.21	.21	.16	.21	.24
	Very much	.21	.54	.28	.36	.17	.17
	N/A	.33	.14	.27	.31	.28	.26
Immorality							
	Not at all	.28	.19	.30	.19	.26	.21
	A little	.15	.27	.11	.20	.29	.37
	Very much	.18	.35	.14	.35	.22	.25
	N/A	.39	.19	.45	.26	.23	.17
Expectations							
	Not at all	.58	.60	.50	.57	.56	.49
	A little	.25	.28	.32	.27	.28	.32
	Very much	.12	.07	.14	.08	.08	.11
	N/A	.05	.05	.04	.08	.08	.08
Coping potential							
	Positive influence	.16	.08	.05	.11	.13	.15
	Distraction	.12	.13	.18	.27	.17	.13
	Escape	.12	.12	.09	.16	.19	.14
	Powerless	.21	.36	.18	.21	.25	.33
	No action	.36	.27	.47	.21	.21	.21
	N/A	.03	.04	.03	.05	.05	.04

Note: Proportions are calculated collapsing data across countries.

DOI: 10.1002/per

Table 3. Fixed part of the regression weights of duration predictors (β) at level 1 (participant level) and predicted category means (PCM) if the remaining appraisal variables take the reference category

		Emotion											
		Fear		Anger		Sadness		Disgust		Shame		Guilt	
Appraisal	Response category	β	PCM	β	PCM	β	PCM	β	PCM	β	PCM	β	PCM
Intercept		2.52		2.60		3.49		2.17		2.92		3.09	
Goals													
	Helped	.21	2.73	.29	2.89*	−.11	3.38	.25	2.42	.31	3.23*	.05	3.14
	Neutral	−.09	2.43***	−.11	2.49***	−.22	3.27***	−.02	2.15***	−.03	2.89***	−.11	2.98***
	Hindered	.33	2.85***	.21	2.81**	.05	3.54***	.28	2.45**	.32	3.24***	.19	3.28***
Self-ideal													
	Positive	−.07	2.45	.19	2.79	−.09	3.40	.09	2.26	−.01	2.91	.08	3.17
	Neutral	−.27	2.25***	−.03	2.57***	−.17	3.32***	−.19	1.98***	−.18	2.74***	−.29	2.80***
	Negative	.02	2.54*	.29	2.89***	.01	3.50*	.34	2.51***	.26	3.18***	.02	3.11
Unfairness													
	Not at all	.15	2.67	.05	2.65	−.02	3.47	.15	2.32	.14	3.06	−.01	3.08
	A little	.23	2.75	.03	2.63	.05	3.54	.09	2.26	.13	3.05	.04	3.13
	Very much	.37	2.89***	.37	2.97***	.06	3.55	.41	2.58***	.30	3.22**	.13	3.22
Immorality													
	Not at all	−.07	2.45	−.12	2.48	−.06	3.43	−.09	2.08*	−.13	2.79***	−.07	3.02
	A little	−.03	2.49	−.14	2.46*	−.08	3.41	−.03	2.14	.05	2.97	−.01	3.08
	Very much	.18	2.70**	.10	2.70***	.01	3.50	.21	2.38***	.39	3.31***	.10	3.19
Expectations													
	Not at all	−.20	2.32*	−.23	2.37	.20	3.69	.10	2.27	−.30	2.62	.13	3.22
	A little	−.13	2.39	−.24	2.36	.18	3.67	.18	2.35	−.28	2.64	.12	3.21
	Very much	−.01	2.51	−.28	2.32	.23	3.72	−.02	2.15	−.26	2.66	.10	3.19
Coping potential													
	Positive influence	−.17	2.35	−.02	2.58	−.08	3.41	−.15	2.02	−.44	2.48	−.11	2.98
	Distraction	−.21	2.31*	−.15	2.45*	−.15	3.34*	−.33	1.84***	−.60	2.32***	−.32	2.77**
	Escape	.12	2.64	.05	2.65	−.14	3.35	−.16	2.01	−.50	2.42	−.28	2.81*
	Powerless	−.07	2.45	−.08	2.52	−.01	3.48	.01	2.18	−.46	2.46	−.21	2.88
	No action	.11	2.63*	.14	2.74**	.13	3.62***	.11	2.28***	−.24	2.68	.16	3.25***

Note. When the relation between a response category and duration varies significantly across level 2 units (countries), the regression weight is underlined. Significance tests are based on a comparison of each predicted category mean with the average predicted mean of the remaining categories (including the 'not applicable' category).
*$p < .01$.
**$p < .001$.
***$p < .0001$.

The relation between the intensity and duration of negative emotions

Intensity ratings varied across episodes: 8% were rated as not very intense, 28% as moderately intense, 35% as intense and 29% as very intense. We calculated the correlation between intensity and duration for each emotion separately and found that, in general, intensity and duration are weakly to moderately correlated. In particular, correlations ranged from .23 for fear to .48 for shame with a median correlation of .39.

The relation between appraisals and the duration of negative emotions

The results of the multi-level analyses[3] are presented in Table 3. Recall that significance tests are based on a comparison of each predicted category mean with the average predicted mean of the remaining categories (including the 'not applicable' category). Given the number of significance tests, we will mainly focus on findings that hold for more than one emotion to avoid possible Type I errors.

Regarding goal congruency, it was found, for each of the six negative emotions under study, that episodes last relatively longer if the eliciting event hinders the achievement of one's goals. In contrast, if the event does not matter for goal achievement, duration is relatively short. For anger and shame, the emotion also lasts relatively longer in the case of goal conducive consequences.

With regard to self-ideal, events that have a negative effect on the individual's self-esteem or self-confidence appear to be associated with relatively longer emotional episodes, unlike events that have no particular consequences for the evaluation of the self for which the associated episodes are relatively shorter. This pattern holds for all six negative emotions, although it is somewhat weaker for guilt.

Concerning values, for fear, anger, disgust and shame, it was found that episodes last relatively longer when the eliciting event is perceived as very unfair. Moreover, for these same emotions, it was also found that episodes last relatively longer when the eliciting event is perceived as very immoral.

[3]Duration was treated as a variable measured on an interval scale. When treating duration as an ordinal variable (or a binary variable after dichotomizing), a highly similar pattern of results was found.

DOI: 10.1002/per

Regarding expectations, no relation was found for five of the six emotions. Only for fear, it was found that episodes are relatively shorter when the eliciting event is not at all expected.

With regard to coping potential, a clear pattern emerges: Emotional episodes tended to last particularly long when the respondent did not think that any action was necessary. In contrast, emotional episodes tended to be relatively short when the respondent pretended that nothing important had happened and tried to think of something else (negation/distraction-type of appraisal). These relations are observed for each of the emotions under study.

Next, we explored possible interactions between appraisals to examine whether particular appraisal category combinations lead to longer negative emotions. However, the large majority of interactions was not significant, and the few interactions that reached significance did not replicate across emotions.

Subsequently, we examined whether the obtained appraisal–duration relationships are dependent upon the recency of the event. This is important as it has been shown (Robinson & Clore, 2002) that people tend to rely on episodic knowledge when reporting on relatively recent emotional experiences (i.e. a couple of weeks ago or less) and semantic knowledge when the emotion occurred a long time ago (i.e. a couple of months ago or more). As a result, estimates of the duration of recent emotions may reflect objective duration, whereas estimates of the duration of emotions that occurred a long time ago may reflect perceived duration. The ISEAR data set contains 35% rather recent episodes (i.e. days ago or weeks ago) and 65% rather old episodes (i.e. months ago or year ago). When examining the appraisal–duration relations separately for recent and old episodes, highly similar results were obtained. This suggests that the mismatch mechanism holds for both actual and perceived emotion duration.

Finally, to ensure that the appraisals–duration relations are not merely caused by an appraisal–intensity relation on the one hand and an intensity–duration relation on the other hand, we examined whether appraisals are still related to duration while controlling for emotional intensity. It appeared that the relation between appraisals and duration while controlling for intensity was highly similar to the results obtained without controlling for intensity except for the relation between coping potential and emotion duration. Regarding the latter, whereas without controlling for intensity, negation/distraction was associated with relatively short emotional episodes for all emotions, this relation was only significant for half of the emotions (fear, disgust and shame) when controlling for intensity.

Variability in duration and appraisal–duration relations between countries

Intercepts and slopes that were found to vary across countries were underlined in Table 3. With regard to the intercepts, it was the first of all found that they varied for each emotion under study. To examine to what degree the implied differences in duration between countries generalize across emotions, we calculated the correlation in duration between emotions across countries. These correlations are presented in Table 4. All correlations are positive, which means that differences in duration between countries partially generalize across emotions. To obtain a better understanding which countries are characterized by relatively long emotions, we first calculated for each country the mean duration across emotions (see Table 5). Subsequently, we divided the countries in a number of geopolitical regions[4] similar to Scherer (1997b) and calculated for each geopolitical region the mean duration across emotions (see Table 4 and Figure 1). The most notable finding is that emotions seem to last especially long in African countries and especially short in North–Central European countries. Finally, we predicted the country-specific intercepts by individualism and gross national product. Significant regression weights are reported in Table 6. To assist their interpretation, a visual representation of the resulting intercepts for countries scoring low and high on individualism and gross national product, respectively, is given in Figure 2. For three emotions, the intercept appeared to be especially high in collectivistic countries, and for five emotions, it was especially high in poor countries.

Table 4. Correlations between emotions across countries for emotion duration

	Fear	Anger	Sadness	Disgust	Shame	Guilt
Fear		0.58	0.62	0.67	0.38	0.28
Anger			0.48	0.71	0.31	0.36
Sadness				0.68	0.32	0.59
Disgust					0.58	0.49
Shame						0.29
Guilt						

Note: Correlations are calculated collapsing data across countries.

With regard to the slopes, it was first of all found that most of them do not vary across countries (see Table 3), meaning that the relation between appraisals and emotion duration is largely universal. Second, for the limited number of relations that varied across countries, inspection of the country-specific estimates revealed that this variability mainly reflects differences in the magnitude and not in the sign of the relations; for example, shame-eliciting events that are perceived as very immoral lead in general to relatively long shame episodes, but for some countries, this effect is more marked than for others. Third, for the relations that varied across countries, we predicted the country-specific slopes by individualism and gross national product. Significant regression weights are provided in Table 6. Again, to assist their interpretation, a visual representation of the resulting slopes for countries scoring low and high on individualism and gross national product, respectively, is given in Figure 3. In one case, the observed pattern holds for more than one emotion: mainly in rich countries, using negation/distraction as a means of coping relates to shorter durations of sadness and shame.

[4]This classification is based on both geographical vicinity as well as political and historical factors related to the regional spread of common cultural elements and the pattern of Western influence during history (see also Scherer, 1997b).

DOI: 10.1002/per

Table 5. Mean negative emotion duration (Duration) by country and country ratings on individualism (IND), gross national product (GNP) and geopolitical region (Region)

Country	Duration	IND	GNP	Region
Botswana	3.34	−.96	−.88	Africa
Zimbabwe	3.28	.87	−.95	Africa
Zambia	3.19	−.96	−1.00	Africa
Norway	3.15	1.03	1.72	North/Central Europe
Malawi	3.14	−.96	−1.02	Africa
Lebanon	3.09	−.22	−.17	Mediterranean Basin
Nigeria	3.05	−.96	−.98	Africa
Bulgaria	3.04	−.67	−.17	Mediterranean Basin
India	3.03	.18	−.99	Asia
Brazil	3.03	−.22	−.72	Latin America
Greece	3.03	−.35	−.40	Mediterranean Basin
El Salvador	2.97	−1.00	−.91	Latin America
USA	2.96	1.93	1.90	New World
Honduras	2.95	−1.00	−.91	Latin America
Venezuela	2.93	−1.28	−.53	Latin America
Portugal	2.91	−.67	−.59	Mediterranean Basin
Mexico	2.91	−.55	−.75	Latin America
Costa Rica	2.89	−1.16	−.77	Latin America
New Zealand	2.89	1.44	.20	New World
Israel	2.81	.42	.13	Mediterranean Basin
Yugoslavia	2.80	−.67	−.65	Mediterranean Basin
Poland	2.79	−.67	−.75	North/Central Europe
Australia	2.78	1.89	.73	New World
Japan	2.78	.10	1.46	Asia
China	2.76	−.96	−.99	Asia
Germany	2.75	.95	1.24	North/Central Europe
Italy	2.75	1.32	.61	Mediterranean Basin
Hongkong	2.73	−.75	.25	Asia
Guatemala	2.71	−1.52	−.89	Latin America
Finland	2.67	.79	1.28	North/Central Europe
Austria	2.66	.42	.85	North/Central Europe
Netherlands	2.65	1.48	.82	North/Central Europe
France	2.62	1.11	1.00	North/Central Europe
Sweden	2.53	1.11	1.43	North/Central Europe
Switzerland	2.52	.99	2.33	North/Central Europe
Spain	2.42	.30	−.09	Mediterranean Basin
Chile	2.28	−.83	−.83	Latin America

Note. Individualism (IND) and gross national product (GNP) are standardized across countries.

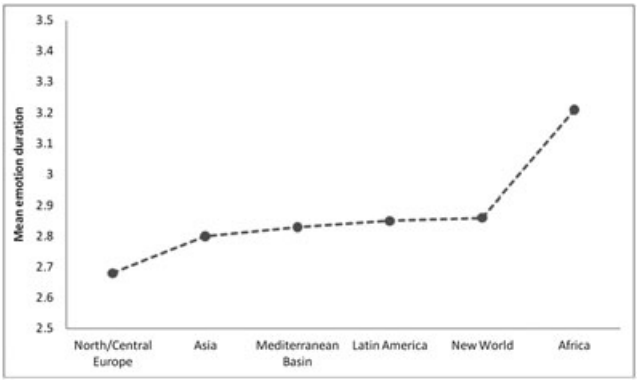

Figure 1. Mean duration across emotions by geopolitical region.

DISCUSSION

The International Survey on Emotion Antecedents and Reactions data set

In the present manuscript, we reported the results of a secondary analysis of hitherto unexplored aspects of the ISEAR data. This data set contains a huge amount of information and can be used to obtain a better understanding of many different aspects of emotions, including the relation between appraisals and emotion duration, and to formulate hypotheses for further research. Moreover, as the ISEAR data were collected in a large number of countries distributed all over the world, it offers the unique opportunity of studying to what degree appraisal–duration relations are universal. To be sure, despite its richness, the ISEAR data set also has some limitations. First, the data are cross-sectional, and consequently, we need to be careful when making causal claims. Even though one may theoretically expect that the causal arrow goes from appraisals to emotions, implicit theories or semantic relations between the concept appraisal and the concept emotion duration may also affected the obtained findings. Experiments are needed to examine this issue further. Second, the ISEAR data were collected during the 1980s and 1990s. Of course, since then, the world has changed, and consequently, certain country-specific findings need to be interpreted cautiously. However, it seems highly unlikely that the (universality of) the relationship between appraisals and emotion duration (i.e. the central topic of this paper) has changed since the data were collected as this relationship can be safely assumed not to be a time-bound phenomenon. Rather, the emotion mechanism, in terms of appraisal results driving the response patterning, can be expected to consist of a psychobiological mechanism that evolves over long periods (Scherer, 2001). Third, as participants were asked to recollect strong emotions, the data pertain to mainly highly salient emotional episodes; as a result, it is not clear to what degree the current findings hold for the entire spectrum of emotional episodes (which also includes minor daily hassles). It is noteworthy that some emotions that were rated as low in intensity may actually also be rather intense as the low intensity episodes probably include episodes that only seem low in intensity when being compared with very intense experiences. Fourth, participants reported retrospectively on emotions, and even though a significant number of emotions took place within the weeks or days preceding the study, a substantial number of emotions took place a long time before the start of the study. It has been shown (Robinson & Clore, 2002) that participants tend to use episodic information when reporting on emotional experiences that occurred recently and semantic knowledge when the emotion occurred a long time ago. As a result, part of the ISEAR data set likely reflects duration estimates reconstructed from long-term memory rather than recall of actual emotion duration for recent events. However, even if semantic memory should have played a role in this reconstruction, this does not invalidate the duration estimates. Recently, Fontaine and Scherer (in press) have reported data from a large study on the semantic profiles of emotion words across 25 languages. The estimated duration differences that are indexed by the respective emotion words they report are very much in line with the recall data reported here. This is consistent with the lexical sedimentation hypothesis (John, Angleitner, & Ostendorf, 1988; Saucier & Goldberg, 1996), which assumes that stable

DOI: 10.1002/per

Table 6. Regression weights of individualism and gross national product as predictors of the intercepts and slopes that were found to vary across countries in Table 3

		Emotion											
		Fear		Anger		Sadness		Disgust		Shame		Guilt	
Appraisal	Response Category	IND	GNP	IND	GNP	IND	GNP	IND	GNP	IND	GNP	IND	GNP
Intercept		−.17	−.20		−.07	−.06	−.05		−.10			−.06	−.07
Goals													
	Neutral											−.10	
	Hindered					.06							
Immorality													
	Very much										.11		
Coping potential													
	Distraction					−.12	−.10				−.15		

Note. Regression weights were only reported if they were significantly different from zero. Individualism (IND) and gross national product (GNP) have been standardized across all countries.

aspects of behavioural phenomena are encoded in lexical structure. Most importantly, the finding that the appraisal–duration relations were highly similar for recent and old episodes suggests that the mismatch mechanism holds for both actual as well as perceived emotion duration. Fifth, emotion duration was measured by a four point scale, whereas a more fine-grained scale would allow for a clearer picture of the distribution of emotion duration. Despite the limitations of the ISEAR data, the present reanalysis led to a clear overall pattern of results.

Variability in emotion duration

Before addressing the key questions of our study, we examined emotion duration per se, and we found that the duration of emotions is highly variable in several respects. First, duration is variable between emotions. Consistent with previous research on emotion duration (Scherer et al., 2004; Verduyn, Delvaux, et al., 2009; Verduyn et al., 2011), sadness was found to be the longest emotion followed by guilt, anger, shame and, finally, the other two emotions under study (i.e. fear and disgust).

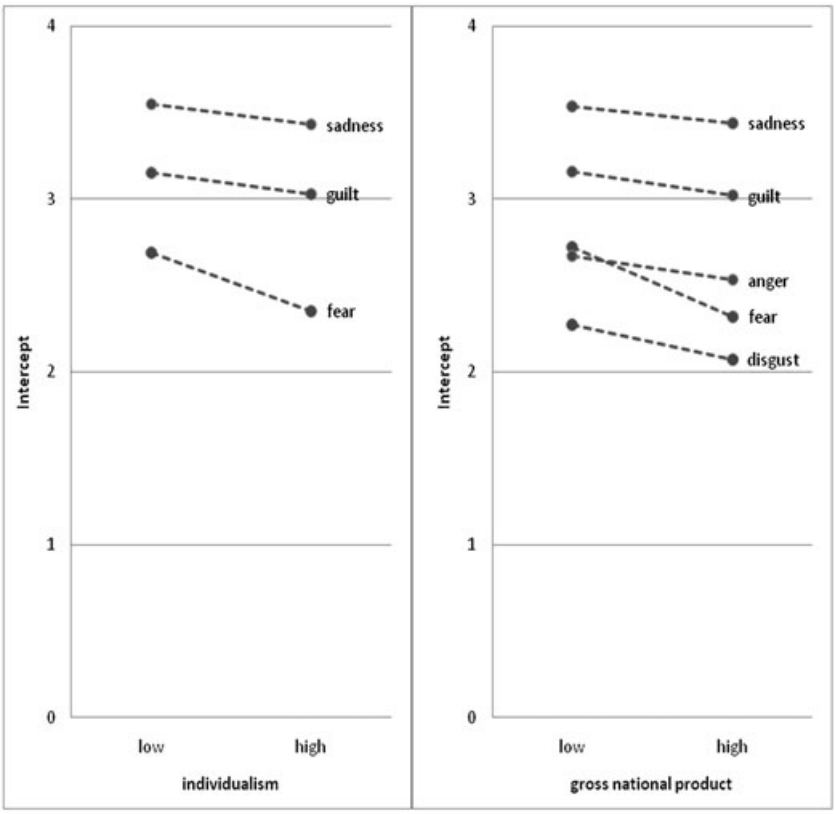

Figure 2. Intercept of countries that score one standard deviation below or above the mean score on individualism (left panel) and gross national product (right panel). Intercepts are only represented if a significant relation with individualism or gross national product was found.

DOI: 10.1002/per

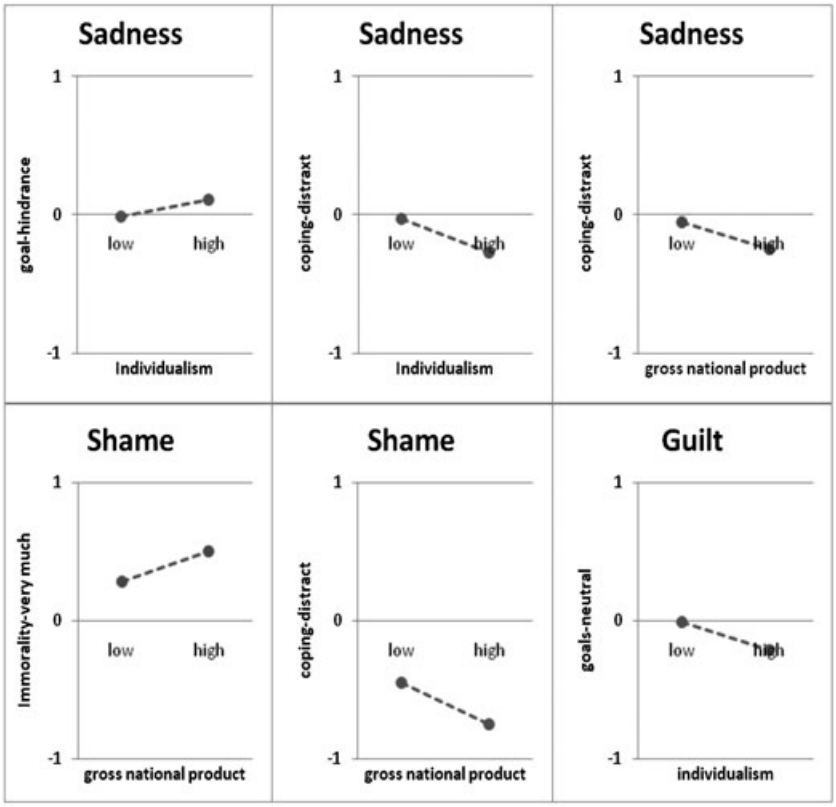

Figure 3. Regression weights of appraisal categories for countries that score one standard deviation below or above the mean score on individualism and gross national product. Regression weights are only represented if a significant relation with individualism or gross national product was found.

Furthermore, duration is variable between countries. In particular, in African, poor and collectivistic countries' emotions last longer, on average, than in North–Central European, rich and individualistic countries. The first possible mechanism accounting for these between-country differences is that in poor/collectivistic countries, negative emotions are more often caused by severe events, which are hard to influence. This may in turn cause the emotions to last relatively long (Wallbott & Scherer, 1988). The second possible process pertains to differences in coping strategies. In several recent studies, it has been shown that different coping strategies tend to be used in different cultures (for an overview, see Kuo, 2011). This difference may, in turn, cause differences in emotion duration even though future studies are needed to examine the implications of this differential use of coping strategies for the duration of emotional experience. Otherwise, probably multiple processes account for differences in emotion duration between countries. For more detail on the relation between emotion duration on the one hand and geopolitical region, gross national product and individualism on the other hand, see Wallbott and Scherer (1988) and Fischer and Manstead (2000). One might object that variability in duration between countries may also partly reflect differences in the meaning of emotion labels. However, although there are certainly minor meaning differences between emotion words in different languages, these differences are dwarfed by the commonality in meaning across languages (Fontaine, Scherer, Roesch, & Ellsworth, 2007). Hence, it is highly unlikely that between-country differences in duration are accounted for to a sizeable degree by language differences.

Finally, duration is also variable within emotions as for each negative emotion under study, it was found that an episode can last for only a couple of minutes up to more than one day. Two remarks regarding this variability need to be made. First, for each emotion studied, it was found that emotions lasting for about one hour are relatively rare compared with both shorter episodes of a couple of minutes and longer episodes lasting for several hours or days. In previous research on emotion duration, it has also been found that negative emotions are typically either rather short or very long (e.g. Verduyn, Delvaux, et al., 2009; Verduyn et al., 2011). This suggests that emotions are typically either short processes preparing the organism to respond rapidly to changes in the environment (e.g. fight–flight responses) or they reflect a severe perturbation of one's goals and desires that cannot be easily recovered from. Second, it may be surprising that emotions can last for several days as it seems unlikely that respondents have felt the emotion in question for days without any interruption. However, emotion duration can be defined in several ways, and depending on the conceptualization used, it makes sense to assume the existence of emotions that last for several days or even longer (Van Mechelen, Verduyn, & Brans, in press). The first possibility is to define duration as the amount of time that elapsed between emotion elicitation and the first moment at which the emotion is not longer felt (Verduyn, Delvaux, et al., 2009; Verduyn, Van Mechelen, et al., 2009; Verduyn et al., 2011). In this case, duration explicitly refers to a period during which

DOI: 10.1002/per

the emotion is actively felt without any interruption. The second possibility is to define duration as the amount of time between emotion elicitation and the moment at which the event has been entirely processed and the person has emotionally come to rest (Frijda, 2007; Frijda et al., 1991). In this case, emotion duration refers to a period that may span one or more interruptions (even though the emotion may be lingering in the background or reach a dormant stage during these interruptions) and estimates of several days or more make perfect sense, especially in cases in which particularly salient and vivid memories are involved. This is the case, for example, for the death of a beloved family member, in addition to the fact that the absence of that person may be regularly noted at specific social occasions. Thus, especially for the emotion of sadness, it seems very plausible that in hindsight, these frequently recurring memories of the sadness are coagulated in the duration assessment, especially as each conscious episode of missing the loved person creates a new episode of sadness. It may be debatable whether these frequently occurring instances should be subsumed under the duration of originally eliciting fact, given that there is a modification of object. However, clearly, in the subjective phenomenology of the emoter, these experiences are integrated. In the ISEAR study, participants were allowed to use their own definition of emotion duration when providing duration estimates. Otherwise, one may note that anyhow the estimates in question were collected using retrospective self-reports. Obviously, alternative assessments such as online and/or indirect measures of emotion duration would have been possible as well (with all kinds of conceptual and methodological complications).

The relation between intensity and the duration of negative emotions

Similar to previous studies (Frederickson & Kahneman, 1993; Sonnemans & Frijda, 1994), weak to moderate correlations between intensity and duration were found. Interestingly, the correlation was weaker for fear compared with the other emotions. This difference could be explained by the manner in which emotions end. Fear episodes relatively often end when the object of fear is removed (e.g. stage fright quickly dissipates when the performance is over) regardless of the intensity of the fear episode. For other negative emotions, this seems to be less the case.

The relation between appraisals and the duration of negative emotions

The first major aim of the present study was to examine the relation between a set of appraisals and the duration of a set of negative emotions. We hypothesized that the more an event is appraised as a mismatch with someone's goals, self-ideal, values, expectations and coping potential, the longer the emotion would last. This hypothesis was supported in most (although not all) cases.

Concerning the relation between emotion duration and goal congruency, the mismatch hypothesis was largely confirmed: Negative emotions tend to last especially long when the achievement of someone's goals is hindered, whereas events that have no particular consequences for someone's goals are associated with relatively shorter durations. This finding is in line with the adaptive function of emotions (Lazarus, 1991; Levenson, 1994) as it is functional to invest more time if one's goals are threatened. The finding that for anger and shame the emotion also lasts relatively long when an event promotes goal achievement is somewhat surprising. One might speculate that this relatively long duration occurs because of a conflict between the goal promoting nature of the event on the one hand and the mismatch the event presumably creates with other desired states (e.g. self-ideal or other goals) on the other hand. This conflict may fuel the emotion and prolong the emotional episode. For example, one may experience extensive shame when receiving effective help (promotion of goal) in a situation in which one fails oneself (mismatch with self-ideal). As another example, one may experience a lengthy episode of anger when being blocked in some pleasure-seeking behaviour (mismatch with short-term goal), which has the consequence of reducing some health risk (promotion of long-term goal).

With regard to the relation between self-ideal and emotion duration, the mismatch hypothesis seems to hold as well. In particular, it was found that negative emotions tend to last relatively long when an event has negative consequences for someone's self-esteem or self-confidence. Symbolic interactionist notions of the self suggest that events that lead to a negative evaluation of the self are very pre-occupying as they may require an adjustment of one's self-concept.

Concerning the relation between values and emotion duration, the mismatch hypothesis was again supported. It was found that the more unfair and immoral the eliciting event is considered to be, the longer the corresponding negative emotion lasts. Interestingly, the relation between unfairness and emotion duration was found even after controlling for the effect of immorality and the other way around, suggesting that unfairness and immorality are at least partly separate dimensions as argued earlier. For more detail, see Mikula, Scherer, and Athenstaedt (1998), who analysed the general issue of injustice in the ISEAR data set and comment on the unique contribution to the duration and intensity variance by injustice and immorality respectively.

The findings regarding the relation between expectations and emotion duration do not support the mismatch hypothesis: In five of the six cases, no relation between expectations and duration was found. For fear, it was even found that episodes are especially short when the eliciting event is unexpected. These results contrast with previous findings on emotion intensity that unexpectedness leads to higher intensity levels (Ortony et al., 1988; Spector, 1956; Verinis et al., 1978). This is further evidence for the relative independence of intensity and duration.

Concerning the relation between duration and coping potential, two patterns emerged. First, negative emotions last longer if one thinks that no action is necessary. One possible reason for this is that respondents may consider the emotions as adaptive. Second, emotions are especially short if respondents were able to pretend that nothing had happened and could think of something else (negation/distraction-type of

DOI: 10.1002/per

appraisal). This finding is consistent with research demonstrating that distraction is an effective strategy for down-regulating negative emotions (Boden & Baumeister, 1997; Fennell & Teasdale, 1984; Morrow & Nolen-Hoeksema, 1990; Wenzlaff, Wegner, & Roper, 1988). Furthermore, this finding could be linked to the mismatch hypothesis with pretending that nothing had happened comes down to ignoring a mismatch between the event and one's goals, self-ideal and values, which may further be conjectured to lead to a shorter emotion duration.

Importantly, the relation between appraisals and emotion duration was still found when controlling for intensity. The only finding that was strongly affected by controlling for intensity was the negative relation between feeling capable to distract and emotion duration. In particular, whereas without controlling for emotional intensity distraction was associated with relatively short episodes for all emotions, this relation was no longer significant for half of the emotions when controlling for emotional intensity. This may reflect that respondents felt especially capable to distract when the emotion was relatively low in intensity.

In sum, in the present study, convincing evidence was found for a relation between appraisals and emotion duration. Theories on determinants of emotion duration are largely lacking (for an overview of some theoretical claims, see Van Mechelen et al., in press), and the present findings indicate the need to incorporate appraisals when developing such a theory. Moreover, appraisals are likely an important class of factors to take into account to understand individual differences in emotion duration. Indeed, part of the variability in appraisals and emotion duration in the ISEAR data set reflects inter-individual variability such that the mismatch mechanism most likely does not only hold within persons but also across individuals. Nevertheless, future studies collecting data on multiple episodes of multiple emotions of multiple persons are needed to examine whether the mismatch mechanism holds equally strongly between and within person or whether this relation is more outspoken at one of the two levels.

One other meaningful way to obtain an even deeper understanding of the appraisal–duration relation would be to study appraisals as time-dynamical phenomena (in contrast to the static approach taken in the present study) and verify how changes in appraisals relate to emotion duration. Research in the field of emotion regulation has shown that people may reappraise an emotion-eliciting event during an emotional episode, and these reappraisals can affect the associated emotion (Gross, 2007). However, measuring both emotions and separate appraisal dimensions as time-dynamic processes and examining how changes in these dimensions influence each other are far from easy. This may explain why studies on the time-dynamic relation between appraisals and emotions are scarce (for an exception, see Tong et al., 2009).

Finally, future research is needed to examine the relationship between appraisals and positive emotions. Similarly to the mismatch–duration relationship for negative emotions, one may expect a match–duration relation for positive ones. Unfortunately, it is not possible to examine this match mechanism in depth by using the ISEAR data set as it only includes one positive emotion, namely joy. Nevertheless, we decided to run some additional analyses to explore the relation between appraisals and the duration of joy. Joy was found to be a relatively long lasting emotion as it lasts on average longer than all negative emotions under study except for sadness. Moreover, joy was found to last especially long when the emotion-eliciting event was perceived as congruent with one's goals, self-ideal and expectations. This provides first support for a match–duration mechanism for positive emotions, but future research is needed to examine whether this mechanism is emotion specific or whether it generalizes across positive emotions.

The relation between appraisals and the duration of negative emotions: universal or culturally specific

The second major aim of this study was to examine to what degree the appraisal–duration relation is universal or culturally specific. Supporting our prediction that the relation in question would be largely universal, in the large majority of cases, appraisal–duration relations did not vary across countries. This finding is not only in line with results from previous cross-cultural studies on the relation between appraisals and the nature or intensity of emotions (Frijda et al., 1995; Mauro et al., 1992; Roseman et al., 1995; Scherer, 1997a) but also with results showing that 'within' countries, the relation between appraisals and emotions hardly varies across individuals (Kuppens, Van Mechelen, & Rijmen, 2008).

Apart from our general finding that appraisal–duration relations are largely universal, a number of exceptions were found as well. However, this does not imply that in those cases, the nature of the appraisal–duration relations was qualitatively different across countries. Indeed, closer inspection of this between-country variability revealed mainly differences in magnitude and not in the sign of the relations.

Part of the between-country variability in appraisal–duration relations we found seems to be accounted for by differences in individualism and gross national product between the countries studied. The most notable findings in this regard were obtained for the distraction–duration relation. In particular, it was found that especially in rich countries, episodes of sadness and shame are relatively short if one feels capable of distracting oneself. One may conjecture that distraction is more effective in rich countries because in those countries sadness and shame may be less deeply rooted or perhaps this is due to the more pervasive nature of distraction in rich countries. Another factor might be the pressure, especially in fast-paced urban settings, to turn to other things.

Conclusion

In the present manuscript, for the first time, the relation between appraisals and the duration of negative emotions was thoroughly examined. The mismatch hypothesis that negative emotions last especially long when the eliciting event and its consequences are perceived to be incongruent with one's desired states was largely confirmed. Moreover,

DOI: 10.1002/per

it was found that appraisal–duration relations are largely universal even though it should be mentioned that some evidence for variability across countries was found as well. However, in the latter case, variability most often reflected differences in magnitude and not differences in the sign of the relations.

ACKNOWLEDGEMENT

The present research was supported by Grant GOA/10/02 from the Research Fund of the University of Leuven.

REFERENCES

Berry, J. W., Poortinga, Y. H., Segall, M. H., & Dasen, P. R. (1992). *Cross-cultural psychology: Research and applications*. Cambridge: Cambridge University Press.

Boden, J. M., & Baumeister, R. F. (1997). Repressive coping: Distraction using pleasant thoughts and memories. *Journal of Personality and Social Psychology*, *73*, 45–62.

Bryk, A. S., & Raudenbush, S. W. (1992). *Hierarchical linear models for social and behavioural research: Applications and data analysis methods*. Newbury Park, CA: Sage.

Davidson, R. J. (1998). Affective style and affective disorders: Perspectives from affective neuroscience. *Cognition & Emotion*, *12*, 307–330.

Eaton, L. G., & Funder, D. C. (2001). Emotional experience in daily life: Valence, variability, and rate of change. *Emotion*, *1*, 413–421.

Ekman, P. (1984). Expression and the nature of emotion. In K. Scherer, & P. Ekman (Eds), *Approaches to Emotion* (pp. 319–344). Hillsdale, NJ: Erlbaum.

Ekman, P. (1994). Strong evidence for universals in facial expression: A reply to Russell's mistaken critique. *Psychological Bulletin*, *115*, 268–287.

Ellsworth, P. C. (1994). Sense, culture, and sensibility. In S. Kitayama, & H. R. Markus (Eds), *Emotion and culture: Empirical studies of mutual influence* (pp. 23–50). Washington, DC: American Psychological Association.

Ellsworth, P. C., & Scherer, K. R. (2003). Appraisal processes in emotion. In R. J. Davidson, H. Goldsmith, & K. R. Scherer (Eds), *Handbook of affective sciences*. New York and Oxford: Oxford University Press.

Fennell, M. J., & Teasdale, J. D. (1984). The effects of distraction on thinking and affect in depressed patients. *British Journal of Clinical Psychology*, *23*, 65–66.

Fischer, A. H., & Manstead, A. S. R. (2000). Gender differences in emotion across cultures. In A. H. Fischer (Ed.), *Emotion and gender: Social psychological perspectives* (pp. 91–97). London: Cambridge University Press.

Fontaine, J. R. J., & Scherer, K. R. (in press). From emotion to feeling and back: The internal structure of the feeling component. In J. R. J. Fontaine, K. R. Scherer, & C. Soriano (Eds), *Components of emotional meaning: A sourcebook*. Oxford: Oxford University Press.

Fontaine, J. R. J., Scherer, K. R., Roesch, E. B., & Ellsworth, P. E. (2007). The world of emotions is not two-dimensional. *Psychological Science*, *18*, 1050–1057.

Fredrickson, B. L. & Kahneman, D. (1993). Duration neglect in retrospective evaluations of affective episodes. *Journal of Personality and Social Psychology*, *65*, 45–55.

Frijda, N. H. (1986). *The emotions*. Cambridge, England: Cambridge University Press.

Frijda, N. H. (2007). *The laws of emotion*. Mahwah: Erlbaum.

Frijda, N., Markam, S., Sato, K., & Wiers, R. (1995). Emotions and emotion words. In J. A. Russel, J.-M. Fernández-Dols, A. S. R. Manstead, & J. C. Wellenkamp (Eds), *Everyday conceptions of emotion* (pp. 121–143). Dordrecht: Kluwer.

Frijda, N. H., Mesquita, B., Sonnemans, J., & Van Goozen, S. (1991). The duration of affective phenomena or: Emotions, sentiments and passions. In K. T. Strongman (Ed.), *International review of studies on emotion* (pp. 187–225). Chichester: John Wiley.

Gilboa, E., & Revelle, W. (1994). Personality and the structure of affective responses. In S. Van Goozen, N. E. Van De Poll, & J. A. Sargent (Eds), *Essays on current issues in the field of emotion theory* (pp. 134–159). Hillsdale, NJ: Lawrence Erlbaum.

Gross, J. J. (Ed.). (2007). *Handbook of emotion regulation*. New York: Guilford Press.

Hemenover, S. H. (2003). Individual differences in rate of affect change: Studies in affective chronometry. *Journal of Personality and Social Psychology*, *85*, 121–131.

Hofstede, G. (1991). *Culture and organizations*. London: McGraw-Hill.

John, O. P., Angleitner, A., & Ostendorf, F. (1988). The lexical approach to personality: A historical review of trait taxonomic research. *European Journal of Personality*, *2*, 171–203.

Kuo, B. C. H. (2011). Culture's consequences on coping: Theories, evidence, and dimensionalities. *Journal of Cross-Cultural Psychology*, *42*, 1082–1102.

Kuppens, P., & Tong, E. M. W. (2010). An appraisal account of individual differences in emotional experiences. *Social and Personality Psychology Compass*, *4*, 1138–1150.

Kuppens, P., & Van Mechelen, I. (2007). Interactional appraisal models for the anger appraisals of threatened self-esteem, other-blame, and frustration. *Cognition & Emotion*, *21*, 56–77.

Kuppens, P., Van Mechelen, I., & Rijmen, F. (2008). Towards disentangling sources of individual differences in appraisal and anger. *Journal of Personality*, *76*, 969–1000.

Lazarus, R. S. (1966). *Psychological stress and the coping process*. New York: McGraw-Hill.

Lazarus, R. S. (1991). *Emotion and adaptation*. Oxford, UK: Oxford University Press.

Levenson, R. W. (1994). Human emotions: A functional view. In P. Ekman, & R. J. Davidson (Eds), *The nature of emotion: Fundamental questions* (pp. 123–126). New York: Oxford University Press.

Mauro, R., Sato, K., & Tucker, J. (1992). The role of appraisal in human emotions: A cross-cultural study. *Journal of Personality and Social Psychology*, *62*, 301–317.

Mesquita, B., & Frijda, N. H. (1992). Cultural variations in emotions: A review. *Psychological Bulletin*, *112*, 179–204.

Mesquita, B., Frijda, N. H., & Scherer, K. R. (1997). Culture and emotion. In J. E. Berry, P. B. Dasen, & T. S. Saraswathi (Eds), *Handbook of cross-cultural psychology: Vol. 2. Basic processes and developmental psychology* (pp. 255–297). Boston: Allyn & Bacon.

Mikula, G., Scherer, K. R., & Athenstaedt, U. (1998). The role of injustice in the elicitation of differential emotional reactions. *Personality and Social Psychology Bulletin*, *24*(7), 769–783.

Morrow, J., & Nolen-Hoeksema, S. (1990). Effects of responses to depression on the remediation of depressive affect. *Journal of Personality and Social Psychology*, *58*, 519–527.

Oatley, K., & Johnson-Laird, P. N. (1987). Towards a cognitive theory of emotions. *Cognition and Emotion*, *1*, 29–50.

Ortony, A., Clore, G., & Collins, A. (1988). *The cognitive structure of emotions*. Cambridge, England: Cambridge University Press.

van Reekum, C. M., & Scherer, K. R. (1997). Levels of processing in emotion-antecedent appraisal. In G. Matthews (Ed.), *Cognitive science perspectives on personality and emotion* (pp. 259–300). Amsterdam: Elsevier.

Robinson, M. D., & Clore, G. L. (2002). Episodic and semantic knowledge in emotional self-report: Evidence for two judgment processes. *Journal of Personality and Social Psychology*, *83*, 198–215.

Roseman, I. J. (1984). Cognitive determinants of emotions: A structural theory. In P. Shaver (Ed.), *Review of personality and social psychology* (Vol. *5*, pp. 11–36). Beverly Hills, CA: Sage Publications.

DOI: 10.1002/per

Roseman, I. J., Dhawan, N., Rettek, S. I., Naidu, R. K., & Thapa, K. (1995). Cultural differences and cross-cultural similarities in appraisals and emotional responses. *Journal of Cross-Cultural Psychology*, *26*, 23–48.

Russell, J. A. (1991). Culture and the categorization of emotion. *Psychological Bulletin*, *110*, 426–450.

Saucier, G., & Goldberg, L. R. (1996). The language of personality: Lexical perspectives on the five-factor model. In J. S. Wiggins (Ed.), *The five-factor model of personality: Theoretical perspectives* (pp. 21–50). New York, NY, US: Guilford Press.

Sbarra, D. A. (2006). Predicting the onset of emotional recovery following nonmarital relationship dissolution: Survival analyses of sadness and anger. *Personality and Social Psychology Bulletin*, *32*, 298–312.

Scherer, K. R. (1984). On the nature and function of emotion: A component process approach. In K. R. Scherer, & P. E. Ekman (Eds), *Approaches to emotion* (pp. 293–317). Hillsdale, NJ: Erlbaum.

Scherer, K. R. (1993). Studying the emotion-antecedent appraisal process: An expert system approach. *Cognition & Emotion*, *7*, 325–355.

Scherer, K. R. (1997a). Profiles of emotion-antecedent appraisal: Testing theoretical predictions across cultures. *Cognition & Emotion*, *11*, 113–150.

Scherer, K. R. (1997b). The role of culture in emotion-antecedent appraisal. *Journal of Personality and Social Psychology*, *73*, 902–922.

Scherer, K. R. (1999). Appraisal theories. In T. Dalgleish, & M. Power (Eds), *Handbook of cognition and emotion* (pp. 637–663). Chichester: Wiley.

Scherer, K. R. (2001). Appraisal considered as a process of multi-level sequential checking. In K. R. Scherer, A. Schorr, & T. Johnstone (Eds), *Appraisal processes in emotion: Theory, methods, research* (pp. 92–120). New York and Oxford: Oxford University Press.

Scherer, K. R., & Wallbott, H. G. (1994). Evidence for universality and cultural variation of differential emotion response patterning. *Journal of Personality and Social Psychology*, *66*, 310–328.

Scherer, K. R., Wallbott, H. G., & Summerfield, A. B. (Eds). (1986). *Experiencing emotion: A crosscultural study*. Cambridge: Cambridge University Press.

Scherer, K. R., Wranik, T., Sangsue, J., Tran, V., & Scherer, U. (2004). Emotions in everyday life: Probability of occurrence, risk factors, appraisal and reaction pattern. *Social Science Information*, *43*(4), 499–570.

Schimmack, U., Oishi, S., Diener, E., & Suh, E. (2000). Facets of affective experiences: A framework for investigations of trait affect. *Personality and Social Psychology Bulletin*, *26*, 655–668.

Schimmack, U. (2003). Affect measurement in experience sampling research. *Journal of Happiness Studies*, *4*, 79–106.

Smith, C. A., & Ellsworth, P. C. (1985). Patterns of cognitive appraisal in emotion. *Journal of Personality and Social Psychology*, *48*, 813–838.

Snijders, T. A. B., & Bosker, R. J. (1999). *Multilevel analysis: An introduction to basic and advanced multilevel modeling*. London: Sage.

Sonnemans, J., & Frijda, N. (1994). The structure of subjective emotional intensity. *Cognition & Emotion*, *8*, 329–350.

Sonnemans, J., & Frijda, N. (1995). The determinants of subjective emotional intensity. *Cognition & Emotion*, *9*, 483–506.

Spector, A. J. (1956). Expectations, fulfillment, and morale. *Journal of Abnormal and Social Psychology*, *52*, 51–56.

Tong, E. M., Bishop, G. D., Enkelmann, H. C., Why, Y. P., Diong, S. M., Khader, M., & Ang, J. (2009). Appraisal underpinnings of affective chronometry: The role of appraisals in emotion habituation. *Journal of Personality*, *77*, 1103–1136.

Tong, E. M. W., Bishop, G. D., Enkelmann, H. C., Why, Y. P., Diong, S. M., Ang, J., & Khader, M. (2006). The role of the Big Five in appraisals. *Personality and Individual Differences*, *41*, 513–523.

Van Mechelen, I., Verduyn, P., & Brans, K. (in press). The duration of emotional episodes. In D. Hermans, B. Rimé, & B. Mesquita (Eds), *Changing Emotions*. London: Psychology Press.

Verduyn, P., Delvaux, E., Van Coillie, H., Tuerlinckx, F., & Van Mechelen, I. (2009). Predicting the duration of emotional experience: Two experience sampling studies. *Emotion*, *9*, 83–91.

Verduyn, P., Van Mechelen, I., & Tuerlinckx, F. (2011). The relation between event processing and the duration of emotional experience. *Emotion*, *11*, 20–28.

Verduyn, P., Van Mechelen, I., Tuerlinckx, F., Meers, K., & Van Coillie, H. (2009). Intensity profiles of emotional experience over time. *Cognition & Emotion*, *23*, 1427–1443.

Verinis, J. S., Brandsma, J. M., & Cofer, C. N. (1978). Discrepancy from expectation in relation to affect and motivation: Tests of McClelland's hypothesis. *Journal of Personality and Social Psychology*, *9*, 47–58.

Wallbott, H. G., & Scherer, K. R. (1988). Emotion and economic development – Data and speculations concerning the relationship between economic factors and emotional experience. *European Journal of Social Psychology*, *18*, 267–273.

Wenzlaff, R. M., Wegner, D. M., & Roper, D. W. (1988). Depression and mental control: The resurgence of unwanted negative thoughts. *Journal of Personality and Social Psychology*, *55*, 882–892.

DOI: 10.1002/per